

## GEPHE SUMMARY

	Gephebase Gene	GephelD
resistant to methyl viologen 1 (RMV1) ( <a href="https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^resistant to methyl viologen 1 (RMV1)^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^resistant to methyl viologen 1 (RMV1)^#gephebase-summary-title</a> )	GP00000982	Main curator
	Entry Status	
Published		

## PHENOTYPIC CHANGE

	Trait Category	
Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title</a> )	Trait	
Polyamine uptake ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=^Polyamine uptake^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=^Polyamine uptake^#gephebase-summary-title</a> )	Trait State in Taxon A	
Arabidopsis thaliana- Colo	Trait State in Taxon B	
Arabidopsis thaliana- Nos-d	Ancestral State	
Data not curated	Taxonomic Status	
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title</a> )		
Taxon A		Taxon B
Arabidopsis thaliana ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title</a> )	Latin Name	Latin Name
thale cress	Common Name	Common Name
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	Synonyms	Synonyms
species	Rank	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis	Lineage	Lineage
Arabidopsis () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3701</a> )	Parent	Parent
3702 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 3702</a> )	NCBI Taxonomy ID	NCBI Taxonomy ID
Yes	is Taxon A an Infraspecies?	is Taxon B an Infraspecies?
Arabidopsis thaliana- Colo	Taxon A Description	Taxon B Description
	Arabidopsis thaliana- Nos-d	

## GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Arabidopsis thaliana
RMV1	Synonyms	GenebankID or UniProtKB
MJJ3_2; POLYAMINE UPTAKE TRANSPORTER 3; PUT3; resistant to methyl viologen 1; At5g05630	String	BT008298 ( <a href="https://www.ncbi.nlm.nih.gov/nucleotide/BT008298">https://www.ncbi.nlm.nih.gov/nucleotide/BT008298</a> )
3702.AT5G05630.1 ( <a href="http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT5G05630.1">http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT5G05630.1</a> )	Sequence Similarities	
Belongs to the amino acid-polyamine-organocation (APC) superfamily. Polyamine:cation symporter (PHS) (TC 2.A.3.12) family.	GO - Molecular Function	
GO:0015293 : symporter activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0015293">https://www.ebi.ac.uk/QuickGO/term/GO:0015293</a> )		

GO:0015203 : polyamine transmembrane transporter activity  
(<https://www.ebi.ac.uk/QuickGO/term/GO:0015203>)

GO - Biological Process

GO:0009408 : response to heat (<https://www.ebi.ac.uk/QuickGO/term/GO:0009408>)

GO:0015839 : cadaverine transport (<https://www.ebi.ac.uk/QuickGO/term/GO:0015839>)

GO:0015846 : polyamine transport (<https://www.ebi.ac.uk/QuickGO/term/GO:0015846>)

GO - Cellular Component

GO:0016021 : integral component of membrane

(<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)

GO:0005886 : plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0005886>)

Presumptive Null

Yes ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Presumptive+Null=^Yes))

Molecular Type

Coding ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular+Type=^Coding))

Aberration Type

SNP ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration+Type=^SNP))

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

Ile377Phe

Experimental Evidence

Linkage Mapping ([#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=^Linkage+Mapping))

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Natural variation in a polyamine transporter determines paraquat tolerance in *Arabidopsis*. (2012) (<https://pubmed.ncbi.nlm.nih.gov/22492932>)

Main Reference

Fujita M; Fujita Y; Iuchi S; Yamada K; Kobayashi Y; Urano K; Kobayashi M; Yamaguchi-Shinozaki K; Shinozaki K

Authors

Polyamines (PAs) are ubiquitous, polycationic compounds that are essential for the growth and survival of all organisms. Although the PA-uptake system plays a key role in mammalian cancer and in plant survival, the underlying molecular mechanisms are not well understood. Here, we identified an *Arabidopsis* L-type amino acid transporter (LAT) family transporter, named RMV1 (resistant to methyl viologen 1), responsible for uptake of PA and its analog paraquat (PQ). The natural variation in PQ tolerance was determined in 22 *Arabidopsis thaliana* accessions based on the polymorphic variation of RMV1. An RMV1-GFP fusion protein localized to the plasma membrane in transformed cells. The *Arabidopsis* rmv1 mutant was highly resistant to PQ because of the reduction of PQ uptake activity. Uptake studies indicated that RMV1 mediates proton gradient-driven PQ transport. RMV1 overexpressing plants were hypersensitive to PA and PQ and showed elevated PA/PQ uptake activity, supporting the notion that PQ enters plant cells via a carrier system that inherently functions in PA transport. Furthermore, we demonstrated that polymorphic variation in RMV1 controls PA/PQ uptake activity. Our identification of a molecular entity for PA/PQ uptake and sensitivity provides an important clue for our understanding of the mechanism and biological significance of PA uptake.

Abstract

Additional References

## RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

## EXTERNAL LINKS

## COMMENTS